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THE "SEA FLEA" *DOLOBROTUS MARDENI* N. GEN., N. SP., A DEEP-WATER AMERICAN LOBSTER BAIT SCAVENGER (AMPHIPODA: EUSIRIDAE)

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Amphipod crustaceans called "sea fleas" or "sand flies" are well known to American and Canadian lobstermen. These amphipods frequently scavenge the bait placed in lobster pots; they will also attack and devour trapped lobsters that have been wounded, but apparently do not molest uninjured lobsters.

Fishermen have been catching American lobsters in baited traps for well over a century, and we may suppose that amphipod scavengers have been feeding on the bait and have been noticed by fishermen for about the same length of time. Yet the voluminous literature on the delectable *Homarus americanus* contains no references to "sea fleas" until the appearance in recent decades of a few notes on these bait scavengers (Templeman, 1954, 1958; Scarratt, 1965; Shave, 1966). Thus far 2 species of "sea fleas" have been identified: *Anonyx sarsi* Steele & Brunel and *Orchomenella pinguis* (Boeck). Both are members of the family Lysianassidae, notorious for its scavengers in the cooler waters of the world oceans (references in Vader, 1972; see also Hessler, Isaacs and Mills, 1972; Bowman and Manning, 1972; Paul, 1973). Two additional amphipod species were collected recently from baited lobster pots by Luis Marden, Chief, Foreign Editoral Staff, National Geographic Magazine, while collecting information for an article about the American lobster (Marden, 1973). Mr. Marden kindly sent his specimens to me, and later forwarded other samples taken from lobster pots by William

Dion, Chief Engineer of the lobster trawler *Mars*. One of Mr. Marden's samples, collected near Petit Manan light, Maine (about 44°22′N), at a depth of about 20 m, contained numerous specimens of *Pontogeneia inermis* (Krøyer) and a single specimen of *Calliopius laeviusculus* (Krøyer). The other samples, collected from lobster pots set at greater depths at the edge of the continental shelf in the vicinity of Atlantis Canyon, south of Nantucket Island, Massachusetts, and almost due east of Philadelphia, Pennsylvania, contained specimens of the new genus and species described below.

EUSIRIDAE (SENSU BARNARD, 1972)

Dolobrotus, new genus

Antenna 1: slightly shorter than antenna 2, with small, apparently unarticulated accessory flagellum. Labium: without inner lobes. Mandible: 3rd segment of palp not widening distally, about ¾ length of 2nd segment. Maxilla 1: inner lobe with fully setose inner margin. Maxilla 2: inner lobe with oblique row of setae. Pereopods 1 and 2 (gnathopods): subchelate; propus sublinear, elongate, especially in pereopod 1; carpus not lobate, sublinear, elongate but shorter than propus; coxa of pereopod 1 slightly narrowing distally. Pereopods 5–7: basis and propus subequal in length. Uropod 3: rami subequal. Telson: cleft to midlength.

Type-species: *Dolobrotus mardeni*, new species.

Etymology: From the Greek "dolos" (= "bait") and "brotos" (= "eating"). Gender, masculine.

Dolobrotus mardeni, new species

Figures 1–27

Material examined (all from lobster pots set in the vicinity of Atlantis Canyon):—Holotype, 7.0 mm ovigerous ♀, (USNM 149127) and several hundred paratypes (149216), 2–4 miles W of Atlantis Canyon, 39°52′N, 70°12′W, depth 170–256 m, received 16 February 1973. 10 paratypes from this collection have been deposited in the National Museum of Natural Sciences, Ottawa, Canada.—25 paratypes (USNM 142192), vicinity of Atlantis Canyon, exact locality unknown, depth 90 m, received 22 August 1972.—Several hundred paratypes (USNM

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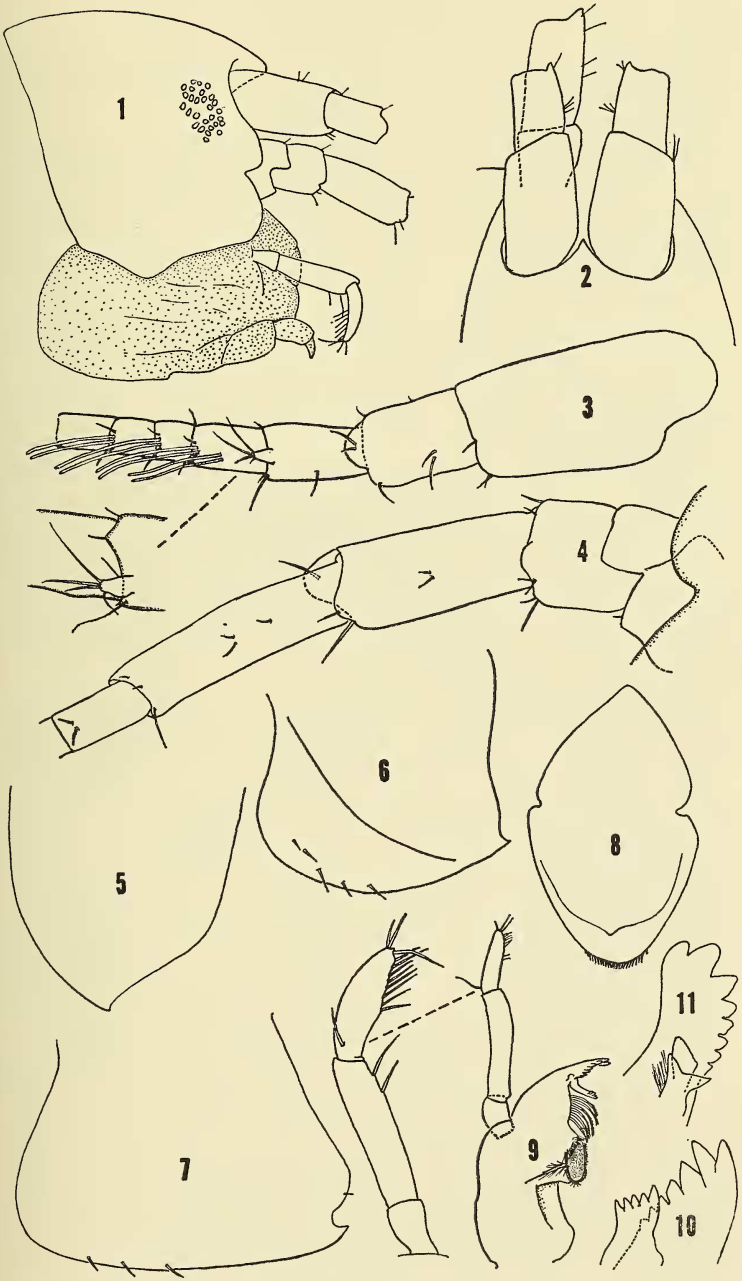
FIGS. 1–11. *Dolobrotus mardeni*. 1, head, lateral; 2, head, dorsal; 3, antenna 1, medial; 4, antenna 2; 5–7, epimera of pleonites 1–3; 8, labrum; 9, left mandible; 10, incisor and lacinia of left mandible; 11, incisor of right mandible.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149217), northern edges of Atlantis Canyon, depth 75–165 m, received 4 May 1973.

Etymology: Named for Luis Marden, who first collected these amphipods and brought them to my attention.

Diagnosis: With the characters of the genus.

Additional description: Length of largest adult 8.5 mm. Eyes: difficult to discern in preserved specimens, without dark pigment; roughly oval in shape, with regular scattered ommatidia. Head: rostrum short, triangular in dorsal view, rounded in lateral view; lateral lobe with sloping dorsal margin and truncate vertical margin; anteroventral corner smoothly rounded. Pereon: smooth dorsal profile. Pereonites 1 and 2 with anterior part of dorsum elevated above posterior part. Pleon: epimera with posteroventral corners pointed; posterior margin above point with shallow concavity in pleonite 2, with deeper concavity in pleonite 3; pleonites 2 and 3 each with 3 spines along ventral margin, pleonite 2 with 2 additional spines anterior and slightly dorsal to marginal spines.

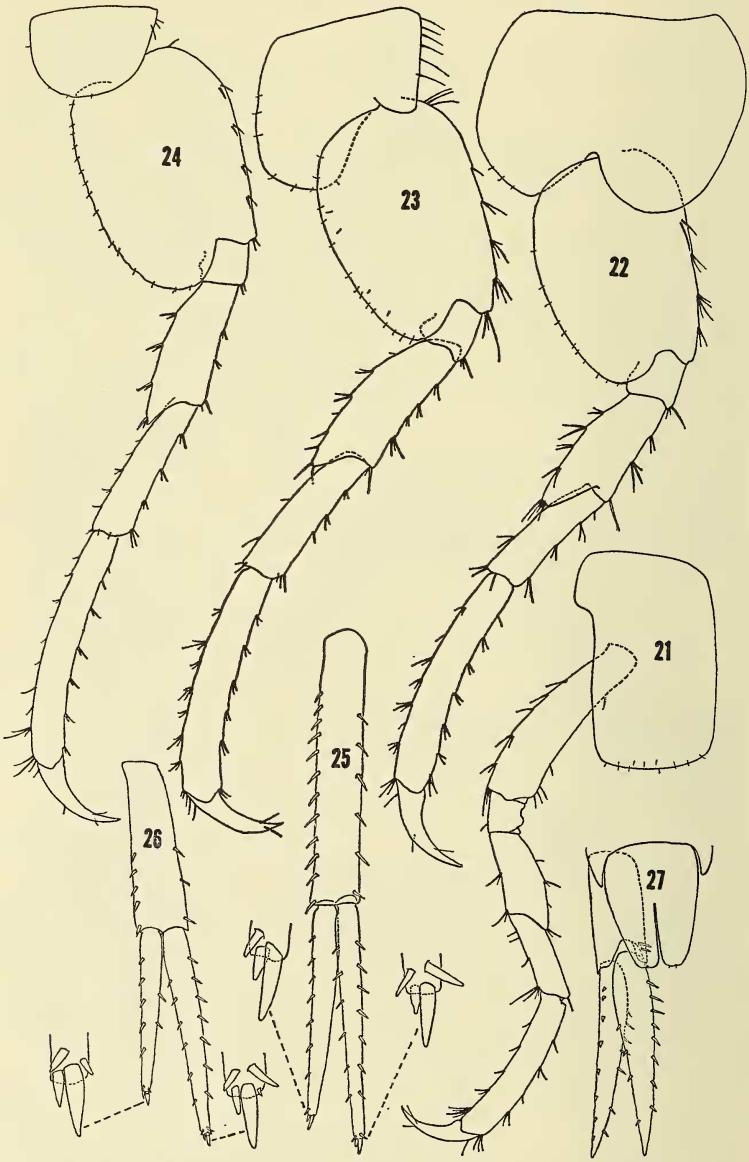
Antenna 1: slightly shorter than antenna 2; 2nd peduncular segment about half as long as 1st, distal margin produced medially into rounded lobe; 3rd peduncular segment subequal in length to 2nd, but narrower; accessory flagellum somewhat less than twice as long as wide, without basal suture separating it from 3rd peduncular segment, bearing 4 apical setae; flagellum with 19–26 segments. Antenna 2: about as long as head and pereon combined; 4th peduncular segment produced into rounded medial lobe; 5th peduncular segment subequal in length to 4th; flagellum with about 22 segments.

Epistome: pointed above, rounded anteriorly, separated from labrum by lateral notches. Labrum: rounded anteriorly; posterior margin evenly rounded, armed with close-set spinules.

Left mandible: incisor with 7–8 teeth; lacinia with 5 teeth; spine row with 6–7 spines. Right mandible: incisor with 8 teeth; spine row with about 8 spines, 2 spines adjacent to incisor broad, truncate, resembling noncuspidate lacinia. Labium: outer lobes densely setose; mandibular processes rather narrow, sublinear. Maxilla 1: inner lobe with about 17 setae along medial margin and a much longer terminal seta; outer lobe with 11 strongly pectinate terminal spines; palp with 11 terminal spines. Maxilla 2: inner lobe with 3 robust apical spines; outer lobe with about 9 stout spines along medial margin; palp with moderately broad 2nd segment and acutely produced distolateral corner of 3rd segment.

Pereopod 1: slender, subchelate, resembling that of *Leptamphopus*; coxa slightly narrowing distally, with rounded distal margin; carpus about ¾ as long as propus, both with densely setose posterior margins, their combined length subequal to that of basis. Pereopod 2: slender, subchelate; basis about ¼ longer than propus, widening distally; carpus about ⅘ as long as propus and slightly broader, both with densely setose posterior margins. Pereopods 3–4: basis slightly longer than propus, nearly linear; dactyl with inner and outer facial setae distally.

FIGS. 12–20. *Dolobrotus mardeni.* 12, labium; 13–15, maxilla 1: 13, inner lobe; 14, apex of outer lobe; 15, apex of palp; 16, maxilla 2, inner lobe (setae omitted except those in oblique row); 17, maxilliped; 18, pereopod 1; 19, pereopod 2; 20, palm and dactyl of pereopod 2 (most setae omitted).



Figs. 21–27. *Dolobrotus mardeni.* 21–24, pereopods 4–7; 25, uropod 1; 26, uropod 2; 27, uropod 3 and telson.

TABLE 1. Comparison of some genera of Eusiridae.

	Dolobrotus	*Bouvierella*	*Djerboa*	*Leptamphopus*	*Oradarea*	*Schraderia*
Longer antenna	A2	A1	A1	A1	A2	A1
Accessory flagellum	short	absent	long, 1-seg.	absent	short	present
Labium, inner lobes	absent	absent	absent	absent	present	absent
Md palp segments 2 & 3	3 shorter	3 shorter	3 shorter	3 = 2	3 shorter	3 shorter
Mx 1 inner lobe	fully setose	setae reduced	fully setose	fully setose	fully setose	fully setose
Mx 2 inner lobe, oblique setae row?	Yes	?	Yes	Yes	Yes	Yes
P1–2, carpus & propus	elongate	slightly elongate	elongate	elongate	elongate	elongate
P3–7 subchelate?	No	Yes	No	No	No	No
Up 3 rami	subequal	subequal	exopod longer	endopod longer	endopod longer	subequal
Telson	cleft to midlength	Emarginate	cleft ⅘	notched	minute notch	cleft ⅘

Pereopods 5–7: P7 > P6 > P5; basis broadly expanded, slightly shorter than propus; dactyls with inner and outer facial setae distally.

Uropod 1: reaching distal end of uropod 3 and slightly beyond distal end of uropod 2; protopod slightly longer than exopod, both margins armed with spines, more numerous on lateral margin; endopod sublinear, slightly longer than exopod, both margins armed with spines, apex bearing 2 spines, lateral half as long as medial. Uropod 2: exopod similar to uropod 1, but protopod subequal in length to exopod, only ¾ length of endopod; exopod with 2 spines on medial margin. Uropod 3: rami lanceolate, with spines on both margins but not at apex. Telson: about ⅓ longer than wide; incised to midlength; each half of apex with minute indentation bearing spinule.

Relationships: *Dolobrotus* belongs to the family Eusiridae sensu Barnard (1972). Barnard (1964) had previously expanded the Eusiridae to incorporate the Pontogeneiidae. The addition of the Calliopiidae in 1972 was anticipated by his statement (1964:57), "The Calliopiidae are simply a mixture of eusirid and pontogeneiid types having the telsonic lobes completely fused." Bousfield (1973), however, did not accept Barnard's combining the Pontogeneiidae with the Eusiridae [Barnard's (1972) addition of the Calliopiidae appeared after Bousfield's book was in press]. My limited experience in gammaridean taxonomy deters me from taking part in the argument; I will only point out that those amphipod genera that appear to be closest to *Dolobrotus* include both Calliopiidae (*Bouvierella*, *Leptamphopus*, *Oradarea*) and Pontogeneiidae (*Djerboa*, *Schraderia*). A comparison of the principal features of all these genera is given in Table 1.

Distribution of lobster bait scavengers: The 2 species of Lysianassidae are panarctic species that occur also in Atlantic boreal waters. *Orchomenella pinguis* ranges south to North Carolina, but *Anonyx sarsi* only reaches Rhode Island (Steele and Brunel, 1968; Bousfield, 1973). Both are found on sandy bottoms, *O. pinguis* to depths of more than 100 m and *A. sarsi* down to about 50 m. Two of the reported attacks on trapped lobsters took place in Seal Cove, Grand Manan, New Brunswick, and the depths were shallow. Templeman's (1954) reported attacks by an amphipod later identified as *Orchomenella pinguis* (Templeman, 1958) took place at 3 fathoms (5.5 m), and the predation by *Anonyx sarsi* reported by Scarratt (1965) was on live lobsters that had been loaded into crates and left floating overnight. Shave (1966) did not give depths for his "sand fleas," identified by Roland Wigley as *Orchomenella* and *Anonyx*.

Pontogeneia inermis is an Arctic boreal species that ranges south in the western Atlantic to Long Island Sound. Bousfield (1973) characterized it as "An essentially pelagic cold-water species; clings to submerged plants and algae, from lower intertidal levels to more than 10 m." I am not aware of any previous reports of its having been attached to bait.

Dolobrotus mardeni appears to inhabit greater depths than the other

known amphipod bait scavengers and probably has not been a pest to lobstermen until the recent development of setting pots at depths of about 100 to 350 m. Thus far it is known only from the vicinity of Atlantis Canyon (about 40°N, 70°10'W). A rather similar amphipod, *Leptamphopus sarsii* Vanhöffen, was recently taken in baited traps near Bergen, Norway, at 450 m, together with several species of Lysianassidae (Vader, 1972).

Predation on lobsters by amphipod bait scavengers: "Sea fleas" are a problem to lobster fishermen not only because they devour the bait in lobster pots, but also because in some circumstances they will attack trapped lobsters. Templeman (1954) noted that the shells of trapped lobsters that had been eaten by amphipods always had a new appearance and were not hard. He believed that these recently molted lobsters had been wounded by hard-shelled lobsters in the same pot, and that amphipods had been attracted to the wounds. Scarrett (1965) observed a lobster placed in an aquarium with a number of *Anonyx*. After 6 hours the lobster had not been attacked, but had eaten about a dozen amphipods. Scarrett concluded that healthy lobsters can resist attack except when their movements are restricted. Lobster fishermen also report that only wounded lobsters are attacked.

Acknowledgments

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